

SEQUENCE LISTING

<110> Sera, Takashi

5 <120> Zinc Finger Domain Recognition Code and Uses Thereof

<130> 109846-130

<150> US 60/220,060

10

<151> 2000-07-21

<160> 69

15 <170> PatentIn version 3.0

<210> 1

<211> 28

<212> PRT

20 <213> Artificial Sequence

<220>

<223> Zinc finger domain.

25 <220>

<221> VARIANT

<222> (1)..(28)

<223> Amino acids 1-3, 8-19 and 25-28 are Xaa wherein Xaa = any amino acid.

30

<220>

<221> VARIANT

<222> (5)..(6)

<223> Amino acid 5 is Xaa wherein Xaa = any amino acid, amino acids 5 and 6 together represent from 2 to 4 amino acids in length.

<220>

<221> VARIANT

<222> (21)..(23)

<223> Amino acid 21 is Xaa wherein Xaa = any amino acid, amino acids 21-23 together represent from 3 to 5 amino acids in length.

<400>> 1

5

Xaa Xaa Xaa Cys Xaa Xaa Cys Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa  
1 5 10 15

Xaa Xaa Xaa His Xaa Xaa Xaa His Xaa Xaa Xaa Xaa

10

20 25

<210> 2

<211> 28

15

<212> PRT

<213> Artificial Sequence

<220>

<223> Zinc finger domain.

20

<220>

<221> VARIANT

<222> (1) .. (28)

25

<223> Amino acids 1-3, 8-12, 14, 17-18 and 25-28 are Xaa wherein Xaa = any amino acid.

<220>

<221> VARIANT

30

<222> (5) .. (6)

<223> Amino acid 5 is Xaa wherein Xaa = any amino acid, amino acids 5 and 6 together represent from 2 to 4 amino acids in length.

<220>

35

<221> VARIANT

<222> (21) .. (23)

<223> Amino acid 21 is Xaa wherein Xaa = any amino acid, amino acids 21-23 together represent from 3 to 5 amino acids in length.

<220>  
<221> VARIANT  
<222> (13)..(13)  
<223> Amino acid 13 is Xaa wherein Xaa = Z-1 wherein Z-1 = Arg or Lys,  
5 Gln or Asn, Thr, Met, Leu or Ile, or Glu or Asp.

<220>  
<221> VARIANT  
<222> (15)..(15)  
10 <223> Amino acid 15 is Xaa wherein Xaa = Z2 wherein Z2 = Ser or Arg,  
Asn Gln, Thr, Val or Ala, or Asp or Glu.

<220>  
<221> VARIANT  
15 <222> (16)..(16)  
<223> Amino acid 16 is Xaa wherein Xaa = Z3 wherein Z3 = His or Lys,  
Asn or Gln, Ser, Ala, or Val, or Asp or Glu.

<220>  
20 <221> VARIANT  
<222> (19)..(19)  
<223> Amino acid 19 is Xaa wherein Xaa = Z6 wherein Z6 = Arg or Lys,  
Gln or Asn, Thr, Tyr, Leu, Ile or Met, or Glu or Asp.

25 <400>> 2

Xaa Xaa Xaa Cys Xaa Xaa Cys Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa  
1 5 10 15

30 Xaa Xaa Xaa His Xaa Xaa Xaa His Xaa Xaa Xaa Xaa  
20 25

35 <210> 3  
<211> 196  
<212> PRT  
<213> Artificial Sequence

<220>

<223> Zinc finger protein.

<400>> 3

5 Val Pro Ile Pro Gly Lys Lys Gln His Ile Cys His Ile Gln Gly  
1 5 10 15

Cys Gly Lys Val Tyr Gly Gln Ser Ser Asp Leu Gln Arg His Leu Arg  
20 25 30

10 Trp His Thr Gly Glu Arg Pro Phe Met Cys Thr Trp Ser Tyr Cys Gly  
35 40 45

15 Lys Arg Phe Thr Arg Ser Ser Asn Leu Gln Arg His Lys Arg Thr His  
50 55 60

Thr Gly Glu Lys Lys Phe Ala Cys Pro Glu Cys Pro Lys Arg Phe Met  
65 70 75 80

20 Arg Ser Asp Glu Leu Ser Arg His Ile Lys Thr His Gln Asn Lys Lys  
85 90 95

Asp Gly Gly Ser Gly Lys Lys Gln His Ile Cys His Ile Gln  
100 105 110

25 Gly Cys Gly Lys Val Tyr Gly Thr Thr Ser Asn Leu Arg Arg His Leu  
115 120 125

Arg Trp His Thr Gly Glu Arg Pro Phe Met Cys Thr Trp Ser Tyr Cys  
30 130 135 140

Gly Lys Arg Phe Thr Arg Ser Ser Asn Leu Gln Arg His Lys Arg Thr  
145 150 155 160

35 His Thr Gly Glu Lys Lys Phe Ala Cys Pro Glu Cys Pro Lys Arg Phe  
165 170 175

Met Arg Ser Asp His Leu Ser Arg His Ile Lys Thr His Gln Asn Lys  
180 185 190

Lys Gly Gly Ser

195

5

<210> 4

<211> 99

<212> PRT

<213> Artificial Sequence

10

<220>

<223> Zinc finger protein.

<400> 4

15

Val Pro Ile Pro Gly Lys Lys Lys Gln His Ile Cys His Ile Gln Gly

1 5 10 15

Cys Gly Lys Val Tyr Gly Thr Thr Ser Asn Leu Arg Arg His Leu Arg

20

20 25 30

Trp His Thr Gly Glu Arg Pro Phe Met Cys Thr Trp Ser Tyr Cys Gly

35 40 45

25

Lys Arg Phe Thr Arg Ser Ser Asn Leu Gln Arg His Lys Arg Thr His

50 55 60

Thr Gly Glu Lys Lys Phe Ala Cys Pro Glu Cys Pro Lys Arg Phe Met

30

65 70 75 80

Arg Ser Asp His Leu Ser Arg His Ile Lys Thr His Gln Asn Lys Lys

85 90 95

35 Gly Gly Ser

<210> 5

<211> 99  
<212> PRT  
<213> Artificial Sequence

5 <220>  
<223> Zinc finger protein.

<400> 5

10 Met Glu Lys Leu Arg Asn Gly Ser Gly Asp Pro Gly Lys Lys Lys Gln  
1 5 10 15

His Ala Cys Pro Glu Cys Gly Lys Ser Phe Ser Gln Ser Ser Asn Leu  
20 25 30

15 Gln Arg His Gln Arg Thr His Thr Gly Glu Lys Pro Tyr Lys Cys Pro  
35 40 45

20 Glu Cys Gly Lys Ser Phe Ser Arg Ser Ser His Leu Gln Gln His Gln  
50 55 60

Arg Thr His Thr Gly Glu Lys Pro Tyr Lys Cys Pro Glu Cys Gly Lys  
65 70 75 80

25 Ser Phe Ser Arg Ser Asp His Leu Ser Arg His Gln Arg Thr His Gln  
85 90 95

Asn Lys Lys

30

<210> 6  
<211> 99  
<212> PRT  
35 <213> Artificial Sequence

<220>  
<223> Zinc finger protein.

<400> 6

Met Glu Lys Leu Arg Asn Gly Ser Gly Asp Pro Gly Lys Lys Gln

5 1 5 10 15

His Ala Cys Pro Glu Cys Gly Lys Ser Phe Ser Gln Ser Ser Asn Leu

20 25 30

10 Gln Arg His Gln Arg Thr His Thr Gly Glu Lys Pro Tyr Lys Cys Pro

35 40 45

Glu Cys Gly Lys Ser Phe Ser Glu Ser Ser Asp Leu Gln Arg His Gln

50 55 60

15 Arg Thr His Thr Gly Glu Lys Pro Tyr Lys Cys Pro Glu Cys Gly Lys

65 70 75 80

Ser Phe Ser Arg Ser Asp His Leu Ser Arg His Gln Arg Thr His Gln

20 85 90 95

Asn Lys Lys

25

<210> 7

<211> 99

<212> PRT

<213> Artificial Sequence

30

<220>

<223> Zinc finger protein.

<400> 7

35

Met Glu Lys Leu Arg Asn Gly Ser Gly Asp Pro Gly Lys Lys Gln

1 5 10 15

His Ala Cys Pro Glu Cys Gly Lys Ser Phe Ser Gln Ser Ser Asn Leu

20                    25                    30

Gln Arg His Gln Arg Thr His Thr Gly Glu Lys Pro Tyr Lys Cys Pro  
35                    40                    45

5

Glu Cys Gly Lys Ser Phe Ser Arg Ser Ser His Leu Gln Glu His Gln  
50                    55                    60

Arg Thr His Thr Gly Glu Lys Pro Tyr Lys Cys Pro Glu Cys Gly Lys  
10 65                    70                    75                    80

Ser Phe Ser Arg Ser Asp His Leu Ser Arg His Gln Arg Thr His Gln  
85                    90                    95

15 Asn Lys Lys

20 <210> 8

<211> 99

<212> PRT

<213> Artificial Sequence

25 <220>

<223> Zinc finger protein.

<400> 8

30 Met Glu Lys Leu Arg Asn Gly Ser Gly Asp Pro Gly Lys Lys Gln  
1                    5                    10                    15

His Ala Cys Pro Glu Cys Gly Lys Ser Phe Ser Gln Ser Ser Asn Leu  
20                    25                    30

35 Gln Arg His Gln Arg Thr His Thr Gly Glu Lys Pro Tyr Lys Cys Pro  
35                    40                    45

Glu Cys Gly Lys Ser Phe Ser Gln Ser Ser Asn Leu Gln Arg His Gln

50                    55                    60

Arg Thr His Thr Gly Glu Lys Pro Tyr Lys Cys Pro Glu Cys Gly Lys  
65                    70                    75                    80

5 Ser Phe Ser Arg Ser Asp His Leu Ser Arg His Gln Arg Thr His Gln  
85                    90                    95

Asn Lys Lys

10

<210> 9  
<211> 99  
15 <212> PRT  
<213> Artificial Sequence

<220>  
<223> Zinc finger protein.

20 <400> 9

Met Glu Lys Leu Arg Asn Gly Ser Gly Asp Pro Gly Lys Lys Lys Gln  
1                    5                    10                    15

25 His Ala Cys Pro Glu Cys Gly Lys Ser Phe Ser Gln Ser Ser Asn Leu  
20                    25                    30

Gln Arg His Gln Arg Thr His Thr Gly Glu Lys Pro Tyr Lys Cys Pro  
30                    35                    40                    45

Glu Cys Gly Lys Ser Phe Ser Arg Ser Ser Asn Leu Gln Glu His Gln  
50                    55                    60

35 Arg Thr His Thr Gly Glu Lys Pro Tyr Lys Cys Pro Glu Cys Gly Lys  
65                    70                    75                    80

Ser Phe Ser Arg Ser Asp His Leu Ser Arg His Gln Arg Thr His Gln  
85                    90                    95

Asn Lys Lys

5

<210> 10  
<211> 99  
<212> PRT  
<213> Artificial Sequence

10

<220>  
<223> Zinc finger protein.

15

Met Glu Lys Leu Arg Asn Gly Ser Gly Asp Pro Gly Lys Lys Gln  
1 5 10 15

20

His Ala Cys Pro Glu Cys Gly Lys Ser Phe Ser Gln Ser Ser Asn Leu  
20 25 30

Gln Arg His Gln Arg Thr His Thr Gly Glu Lys Pro Tyr Lys Cys Pro  
35 40 45

25

Glu Cys Gly Lys Ser Phe Ser Gln Ser Ser Asp Leu Gln Arg His Gln  
50 55 60

Arg Thr His Thr Gly Glu Lys Pro Tyr Lys Cys Pro Glu Cys Gly Lys  
65 70 75 80

30

Ser Phe Ser Arg Ser Asp His Leu Ser Arg His Gln Arg Thr His Gln  
85 90 95

Asn Lys Lys

35

<210> 11  
<211> 229  
<212> PRT

<213> Human

<400> 11

5 Met Arg Leu Ala Lys Pro Lys Ala Gly Ile Ser Arg Ser Ser Ser Gln  
1 5 10 15

Gly Lys Ala Tyr Glu Asn Lys Arg Lys Thr Gly Arg Gln Arg Glu Lys  
20 25 30

10 Trp Gly Met Thr Ile Arg Phe Asp Ser Ser Phe Ser Arg Leu Arg Arg  
35 40 45

Ser Leu Asp Asp Lys Pro Tyr Lys Cys Thr Glu Cys Glu Lys Ser Phe  
15 50 55 60

Ser Gln Ser Ser Thr Leu Phe Gln His Gln Lys Ile His Thr Gly Lys  
65 70 75 80

20 Lys Ser His Lys Cys Ala Asp Cys Gly Lys Ser Phe Phe Gln Ser Ser  
85 90 95

Asn Leu Ile Gln His Arg Arg Ile His Thr Gly Glu Lys Pro Tyr Lys  
25 100 105 110

Cys Asp Glu Cys Gly Glu Ser Phe Lys Gln Ser Ser Asn Leu Ile Gln  
115 120 125

30 His Gln Arg Ile His Thr Gly Glu Lys Pro Tyr Gln Cys Asp Glu Cys  
130 135 140

Gly Arg Cys Phe Ser Gln Ser Ser His Leu Ile Gln His Gln Arg Thr  
145 150 155 160

35 His Thr Gly Glu Lys Pro Tyr Gln Cys Ser Glu Cys Gly Lys Cys Phe  
165 170 175

Ser Gln Ser Ser His Leu Arg Gln His Met Lys Val His Lys Glu Glu

	180	185	190
	Lys Pro Arg Lys Thr Arg Gly Lys Asn Ile Arg Val Lys Thr His Leu		
	195	200	205
5			
	Pro Ser Trp Lys Ala Gly Thr Glu Gly Ser Leu Trp Leu Val Ser Val		
	210	215	220
	Lys Tyr Arg Ala Phe		
10			
	225		
	<210> 12		
	<211> 393		
15	<212> PRT		
	<213> Mouse		
	<400> 12		
20	Met Ser Glu Glu Pro Leu Glu Asn Ala Glu Lys Asn Pro Gly Ser Glu		
	1	5	10
			15
	Glu Ala Phe Glu Ser Gly Asp Gln Ala Glu Arg Pro Trp Gly Asp Leu		
	20	25	30
25	Thr Ala Glu Glu Trp Val Ser Tyr Pro Leu Gln Gln Val Thr Asp Leu		
	35	40	45
	Leu Val His Lys Glu Ala His Ala Gly Ile Arg Tyr His Ile Cys Ser		
30	50	55	60
	Gln Cys Gly Lys Ala Phe Ser Gln Ile Ser Asp Leu Asn Arg His Gln		
	65	70	75
			80
35	Lys Thr His Thr Gly Asp Arg Pro Tyr Lys Cys Tyr Glu Cys Gly Lys		
	85	90	95
	Gly Phe Ser Arg Ser Ser His Leu Ile Gln His Gln Arg Thr His Thr		
	100	105	110

Gly Glu Arg Pro Tyr Asp Cys Asn Glu Cys Gly Lys Ser Phe Gly Arg  
 115 120 125

5 Ser Ser His Leu Ile Gln His Gln Thr Ile His Thr Gly Glu Lys Pro  
 130 135 140

His Lys Cys Thr Glu Cys Ala Lys Ala Ser Ala Ala Ser Pro His Leu  
 145 150 155 160

10 Ile Gln His Gln Arg Thr His Ser Gly Glu Lys Pro Tyr Glu Cys Glu  
 165 170 175

Glu Cys Gly Lys Ser Phe Ser Arg Ser Ser His Leu Ala Gln His Gln  
 15 180 185 190

Arg Thr His Thr Gly Glu Lys Pro Tyr Glu Cys His Glu Cys Gly Arg  
 195 200 205

20 Gly Phe Ser Glu Arg Ser Asp Leu Ile Lys His Tyr Arg Val His Thr  
 210 215 220

Gly Glu Arg Pro Tyr Lys Cys Asp Glu Cys Gly Lys Asn Phe Ser Gln  
 225 230 235 240

25 Asn Ser Asp Leu Val Arg His Arg Arg Ala His Thr Gly Glu Lys Pro  
 245 250 255

Tyr His Cys Asn Glu Cys Gly Glu Asn Phe Ser Arg Ile Ser His Leu  
 30 260 265 270

Val Gln His Gln Arg Thr His Thr Gly Glu Lys Pro Tyr Glu Cys Thr  
 275 280 285

35 Ala Cys Gly Lys Ser Phe Ser Arg Ser Ser His Leu Ile Thr His Gln  
 290 295 300

Lys Ile His Thr Gly Glu Lys Pro Tyr Glu Cys Asn Glu Cys Trp Arg  
 305 310 315 320

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Ser Phe Gly Glu Arg Ser Asp Leu Ile Lys His Gln Arg Thr His Thr  
325 330 335

5 Gly Glu Lys Pro Tyr Glu Cys Val Gln Cys Gly Lys Gly Phe Thr Gln  
340 345 350

Ser Ser Asn Leu Ile Thr His Gln Arg Val His Thr Gly Glu Lys Pro  
355 360 365

10 Tyr Glu Cys Thr Glu Cys Asp Lys Ser Phe Ser Arg Ser Ser Ala Leu  
370 375 380

Ile Lys His Lys Arg Val His Thr Asp  
15 385 390

<210> 13  
<211> 28

20 <212> PRT  
<213> Artificial Sequence

<220>

25 <223> Zinc finger domain.

<220>  
<221> VARIANT  
<222> (13) .. (13)

30 <223> Amino acid 13 is Xaa wherein Xaa = Z-1 wherein Z-1 = Arg or Lys,  
Gln or Asn, Thr, Met, Leu or Ile, or Glu or Asp.

<220>  
<221> VARIANT  
35 <222> (15) .. (15)

<223> Amino acid 15 is Xaa wherein Xaa = Z2 wherein Z2 = Ser or Arg,  
Asn or Gln, Thr, Val, or Ala, or Asp or Glu.

<220>

<221> VARIANT  
<222> (16)..(16)  
<223> Amino acid 16 is Xaa wherein Xaa = Z3 wherein Z3 = His or Lys,  
Asn or Gln, Ser, Ala, or Val, or Asp or Glu.  
5

<220>  
<221> VARIANT  
<222> (19)..(19)  
<223> Amino acid 19 is Xaa wherein Xaa = Z6 wherein Z6 = Arg or Lys,  
10 Gln or Asn, Thr, Tyr, Leu, Ile or Met, or Glu or Asp.

<400> 13

Pro Tyr Lys Cys Pro Glu Cys Gly Lys Ser Phe Ser Xaa Ser Xaa Xaa  
15 1 5 10 15

Leu Gln Xaa His Gln Arg Thr His Thr Gly Glu Lys  
20 25

20

<210> 14  
<211> 10  
<212> DNA  
<213> Tomato golden mosaic virus

25

<400> 14  
agtaaggtag 10

30 <210> 15  
<211> 28  
<212> PRT  
<213> Artificial Sequence

35 <220>  
<223> Zinc finger domain.

<400> 15

Pro Tyr Lys Cys Pro Glu Cys Gly Lys Ser Phe Ser Gln Ser Asp Ser  
1 5 10 15

Leu Gln Arg His Gln Arg Thr His Thr Gly Glu Lys  
5 20 25

<210> 16

<211> 28

10 <212> PRT

<213> Artificial Sequence

<220>

<223> Zinc finger domain.

15

<400> 16

Pro Tyr Lys Cys Pro Glu Cys Gly Lys Ser Phe Ser Arg Ser Asp Asn  
1 5 10 15

Leu Gln Gln His Gln Arg Thr His Thr Gly Glu Lys  
20 25

<210> 17

25 <211> 28

<212> PRT

<213> Artificial Sequence

<220>

30 <223> Zinc finger domain.

<400> 17

Pro Tyr Lys Cys Pro Glu Cys Gly Lys Ser Phe Ser Thr Ser Thr His  
35 1 5 10 15

Leu Gln Gln His Gln Arg Thr His Thr Gly Glu Lys  
20 25

<210> 18  
<211> 11  
<212> PRT  
5 <213> Human immunodeficiency virus

<400> 18

Tyr Gly Arg Lys Lys Arg Arg Gln Arg Arg Arg  
10 1 5 10

<210> 19  
<211> 30  
15 <212> PRT  
<213> Artificial Sequence

<220>  
<223> Acid dimerization peptide.  
20 <400> 19

Ala Gln Leu Glu Lys Glu Leu Gln Ala Leu Glu Lys Glu Asn Ala Gln  
1 5 10 15  
25 Leu Glu Trp Glu Leu Gln Ala Leu Glu Lys Glu Leu Ala Gln  
20 25 30

<210> 20  
30 <211> 30  
<212> PRT  
<213> Artificial Sequence

<220>  
35 <223> Basic dimerization peptide.  
<400> 20

Ala Gln Leu Lys Lys Leu Gln Ala Leu Lys Lys Asn Ala Gln

1 5 10 15

Leu Lys Trp Lys Leu Gln Ala Leu Lys Lys Lys Leu Ala Gln

20 25 30

5

<210> 21

<211> 20

<212> PRT

10 <213> Artificial Sequence

<220>

<223> Flexible linker.

15 <400> 21

Gly Gly Gly Gly Ser Gly Gly Gly Ser Gly Gly Gly Ser Gly

1 5 10 15

20 Gly Gly Gly Ser

20

25 <210> 22

<211> 9

<212> DNA

<213> Artificial Sequence

30 <220>

<223> Flexible linker.

<400> 22

gcagaagcc

9

35

<210> 23

<211> 5

<212> PRT

<213> Artificial Sequence

<220>

<223> Flexible linker.

5

<400> 23

Gly Gly Gly Gly Ser

1 5

10

<210> 24

<211> 26

<212> DNA

15 <213> Artificial Sequence

<220>

<223> All target polynucleotide.

20

<400> 24

tatataataag taaggtagta tatata

26

<210> 25

25 <211> 26

<212> DNA

<213> Artificial Sequence

<220>

30 <223> Target polynucleotide for zinc finger protein Zif268.

<400> 25

tatatatatgc gtgggcgtta tatata

26

35

<210> 26

<211> 26

<212> DNA

<213> Artificial Sequence

<220>  
<223> ZFP target sequence.

5 <400> 26  
tatatatataag taaggttagta tatata 26

10 <210> 27  
<211> 26  
<212> DNA  
<213> Artificial Sequence

15 <220>  
<223> ZFP target sequence.  
<400> 27  
tatatatataag taaggtaata tatata 26

20 <210> 28  
<211> 26  
<212> DNA  
<213> Artificial Sequence

25 <220>  
<223> ZFP target sequence.  
<400> 28  
tatatatataag taaggtatta tatata 26

30 <210> 29  
<211> 26  
35 <212> DNA  
<213> Artificial Sequence  
<220>  
<223> ZFP target sequence.

<400> 29  
tatataataag taaggtacta tatata

26

5

<210> 30  
<211> 84  
<212> PRT  
10 <213> Artificial Sequence

<220>  
<223> Zinc finger protein.

15 <220>  
<221> VARIANT  
<222> (15)..(15)  
<223> Amino acid 15 is "Xaa" wherein "Xaa" = Asp or Gly.

20 <400> 30

Pro Tyr Lys Cys Pro Glu Cys Gly Lys Ser Phe Ser Asp Ser Xaa Ala

1 5 10 15

25 Leu Gln Arg His Gln Arg Thr His Thr Gly Glu Lys Pro Tyr Lys Cys  
20 25 30

30 Pro Glu Cys Gly Lys Ser Phe Ser Gln Ser Ser Asn Leu Gln Lys His  
35 35 40 45

Gln Arg Thr His Thr Gly Glu Lys Pro Tyr Lys Cys Pro Glu Cys Gly  
50 55 60

35 Lys Ser Phe Ser Arg Ser Asp His Leu Gln Arg His Gln Arg Thr His  
65 70 75 80

Thr Gly Glu Lys

<210> 31  
<211> 10  
5 <212> DNA  
<213> Artificial Sequence

<220>  
<223> Degenerate DNA probe.

10 <220>  
<221> misc\_feature  
<222> (7)..(10)  
<223> Nucleotides 7-10 are "n" wherein "n" = g, a, t, or c.

15 <400> 31  
ggggaannnn 10

20 <210> 32  
<211> 26  
<212> DNA  
<213> Artificial Sequence

25 <220>  
<223> Zinc finger domain target sequence.

<220>  
<221> misc\_feature  
30 <222> (14)..(16)  
<223> Nucleotides 14-16 are "n" wherein "n" = g, a, t, or c.

<400> 32  
tatatatatagg ggaannngta tatata 26

35 <210> 33  
<211> 26  
<212> DNA

<213> Artificial Sequence

<220>

5 <223> Zinc finger domain target sequence.

<220>

<221> misc\_feature

<222> (15)..(17)

10 <223> Nucleotides 15-17 are "n" wherein "n" = g, a, t, or c.

<400> 33

tatatatagg ggaannata tatata

26

15

<210> 34

<211> 26

<212> DNA

<213> Artificial Sequence

20

<220>

<223> Zinc finger domain target sequence.

<220>

25 <221> misc\_feature

<222> (15)..(17)

<223> Nucleotides 15-17 are "n" wherein "n" = g, a, t, or c.

<400> 34

30 tatatatagg ggaannntta tatata

26

<210> 35

<211> 26

35 <212> DNA

<213> Artificial Sequence

<220>

<223> Zinc finger domain target sequence.

Sequence Database

<220>  
<221> misc\_feature  
<222> (15)..(17)  
5 <223> Nucleotides 15-17 are "n" wherein "n" = g, a, t, or c.

<400> 35  
tatatatatagg ggaanncta tatata

26

10

<210> 36  
<211> 60  
<212> DNA  
<213> Artificial Sequence

15

<220>  
<223> Partial zinc finger domain oligomer.

20

<220>  
<221> misc\_feature  
<222> (45)..(56)  
  
<223> Nucleotides 45-47 and 51-56 are "n" wherein "n" = g, a, t, or c.

25

<400> 36  
ggggagaagc cgtataaatg tccggaatgt ggtaaaagtt ttagcnnnag cnnnnnnntg 60

30

<210> 37  
<211> 60  
<212> DNA  
<213> Artificial Sequence

35

<220>  
<223> Partial zinc finger domain oligomer.

<220>  
<221> misc\_feature  
<222> (37)..(51)

DRAFT  
Sequence  
Database

<223> Nucleotides 37-39 and 46-51 are "n" wherein "n" = g, a, t, or c.

<400> 37

tttgtatgg tttcacccgg tatgggtacg ctgatgnnc tgcaannnn ngctnnngct 60

5

<210> 38

<211> 60

<212> DNA

10 <213> Artificial Sequence

<220>

<223> Partial zinc finger domain oligomer.

15 <220>

<221> misc\_feature

<222> (46)..(57)

<223> Nucleotides 46-48 and 52-57 are "n" wherein "n" = g, a, t, or c.

20 <400> 38

ggtgaaaaaac catacaaatg tccagagtgc ggcaaatctt tctctnnntc tnnnnnnctt 60

<210> 39

<211> 60

<212> DNA

25 <213> Artificial Sequence

<220>

<223> Partial zinc finger domain oligomer.

30 <220>

<221> misc\_feature

<222> (37)..(51)

35 <223> Nucleotides 37-39 and 46-51 are "n" wherein "n" = g, a, t, or c.

<400> 39

cttgtaaggc ttctcgccag tgtgagtacg ctgatgnnc tgaagnnnn nagannnaga 60

5       <210> 40  
      <211> 56  
      5    <212> DNA  
      <213> Artificial Sequence

10      <220>  
      <223> Partial zinc finger domain oligomer.  
10      <220>  
      <221> misc\_feature  
      <222> (48)..(58)  
      <223> Nucleotides 48-50 and 54-58 are "n" wherein "n" = g, a, t, or c.  
15      <400> 40  
      ggcgagaagc cttacaagtg ccctgaatgc ggaaagagct ttagtnnnag tnnnnn       56

20      <210> 41  
      <211> 55  
      <212> DNA  
      <213> Artificial Sequence

25      <220>  
      <223> Partial zinc finger domain oligomer.  
      <220>  
      <221> misc\_feature  
30      <222> (28)..(48)  
      <223> Nucleotides 28-30, 37-42 and 46-48 are "n" wherein "n" = g, a, t,  
                or c  
  
      <400> 41  
35      cttctccccc gtgtgcgtgc gttggtnnn ttgtaannnn nnactnnnac taaag       55

      <210> 42  
      <211> 45

DRAFT

<212> DNA  
<213> Artificial Sequence

<220>

5 <223> PCR primer.

<400> 42  
gggccccggtc tcgaattcg ggagaagccg tataaatgtc cgaa 45

10

<210> 43  
<211> 48  
<212> DNA  
<213> Artificial Sequence

15

<220>

<223> PCR primer.

<400> 43

20 cccgggggtc tcaagctttt acttctcccc cgtgtgcgtg cgttggtg 48

25

<210> 44  
<211> 10  
<212> DNA  
<213> Beet curly top virus

<400> 44

30 ttgggtgctc 10

35

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5  
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<210> 47  
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30      <400> 50  
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10 <213> Arabidopsis

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15

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25

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<212> DNA

<213> Artificial Sequence

30

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44

35

<210> 56

<211> 45

<212> DNA

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60  
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5

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5 <210> 66  
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15 <400> 66  
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20 <210> 67  
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35 <210> 68  
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40 <220>  
<223> Zinc finger domain.

45 <220>  
<221> VARIANT  
<222> (13)..(13)  
<223> Amino acid 13 is "Xaa" wherein "Xaa" = Z1 wherein Z1 = Arg, Gln,  
Thr, Met or Glu

<220>  
<221> VARIANT  
<222> (15)..(15)  
5  
<223> Amino acid 15 is "Xaa" wherein "Xaa" = Z2 wherein Z2 = Ser, Asn,  
Thr, or Asp

10 <220>  
<221> VARIANT  
<222> (16)..(16)  
<223> Amino acid 16 is "Xaa" wherein "Xaa" = Z3 wherein Z3 = His, Asn,  
Ser, or Asp

15 <220>  
<221> VARIANT  
<222> (19)..(19)  
<223> Amino acid 19 is "Xaa" wherein "Xaa" = Z6 wherein Z6 = Arg, Gln,  
Thr, Tyr, Leu, or Glu

20 <400> 68

Gln His Ala Cys Pro Glu Cys Gly Lys Ser Phe Ser Xaa Ser Xaa Xaa  
1 5 10 15

25 Leu Gln Xaa His Gln Arg Thr His Thr Gly Glu Lys  
20 25

30 <210> 69  
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35 <220>  
<223> Zinc finger domain.

<220>  
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<223> Amino acid 13 is "Xaa" wherein "Xaa" = Z1 wherein Z1 = Arg, Gln, Thr, Met, or Glu

<220>

5 <221> VARIANT

<222> (15)..(15)

<223> Amino acid 15 is "Xaa" wherein "Xaa" = Z2 wherein Z2 = Ser, Asn, Thr, or Asp.

10 <220>

<221> VARIANT

<222> (16)..(16)

<223> Amino acid 16 is "Xaa" wherein "Xaa" = Z3 wherein Z3 = His, Asn, Ser, or Asp

15 <220>

<221> VARIANT

<222> (19)..(19)

20 <223> Amino acid 19 is "Xaa" wherein "Xaa" = Z6 wherein Z6 = Arg, Gln, Thr, Tyr, Leu, or Glu.

<400> 69

25 Pro Tyr Lys Cys Pro Glu Cys Gly Lys Ser Phe Ser Xaa Ser Xaa Xaa

1 5 10 15

Leu Ser Xaa His Gln Arg Thr His Thr Gly Glu Lys

20 25

30